

REVISION AND NEW SPECIES OF THE
APOCEPHALUS (*MESOPHORA*)
TRUNCATICERCUS-INFRAGROUP
(DIPTERA: PHORIDAE)

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ABSTRACT. The putatively monophyletic *Apocephalus* (*Mesophora*) *truncaticercus*-infragroup is diagnosed with hypothesized synapomorphic character states. Three new species are described: *A. grandiflavus* from the Dominican Republic, and two from Costa Rica, *A. nitifrons* and *A. satanus*. The previously unknown females of *A. brevicercus* and *A. truncaticercus* are recognized, and both species are redescribed. A key for the identification of adults of this group is presented. Species are extremely similar, and little can be said about their phylogenetic relationships at this time, except that it is possible that *A. brevicercus* and *A. grandiflavus* are exclusive sister species.

INTRODUCTION

In my revision of the parasitic genus *Apocephalus*, subgenus *Mesophora* (Brown, 1993), I described two new, closely related species: *A. truncaticercus* and *A. brevicercus*. Both were known only from male specimens collected at a single locality in Costa Rica. Since that time, a number of new specimens have been collected, including the apparent females of *A. truncaticercus* and *A. brevicercus*, as well as three new species from Costa Rica and the Dominican Republic.

METHODS AND MATERIALS

Treatment of specimens and terms used are the same as in my previous publications (e.g., Brown, 1992). In the descriptions, the following ratios are used: frontal ratio = height of frons divided by width of frons slightly below the anterior ocellus; costal ratio = distance from basicosta to costal apex, divided by distance from basicosta to wing apex; and costal sector ratio = distance, along the costa, from humeral crossvein to apex of vein R₁ (sector 1):R₁ to R₂₊₃ (sector 2):R₂₊₃ to R₄₊₅ (sector 3) (all sector measurements are standardized by dividing by the length of sector 3). Unless fewer specimens were available, at least 10 individuals were measured.

Latitude and longitude coordinates are quoted as on data labels, either as degrees and minutes (e.g., 35°30'N) or as decimal degrees (e.g., 35.5°N).

Depositories of the material examined are as follows:

- CMNH Section of Invertebrate Zoology, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, PA 15213-4080, USA (C.W. Young)
INBIO Instituto Nacional de Biodiversidad, A.P. 22-

- 3100, Santo Domingo, Heredia, Costa Rica (M. Zumbado)
LACM Entomology Section, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA 90007, USA (B.V. Brown)
MCZ Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138, USA (on indefinite loan to the author)
MICR Museo de Insectos, Universidad de Costa Rica, San Pedro, San José, Costa Rica (P.S. Hanson)
USNM United States National Museum, Smithsonian Institution, Washington, DC 20560, USA (on indefinite loan to the author)

SYSTEMATICS

Apocephalus Coquillett, 1901,
subgenus *Mesophora* Borgmeier, 1937

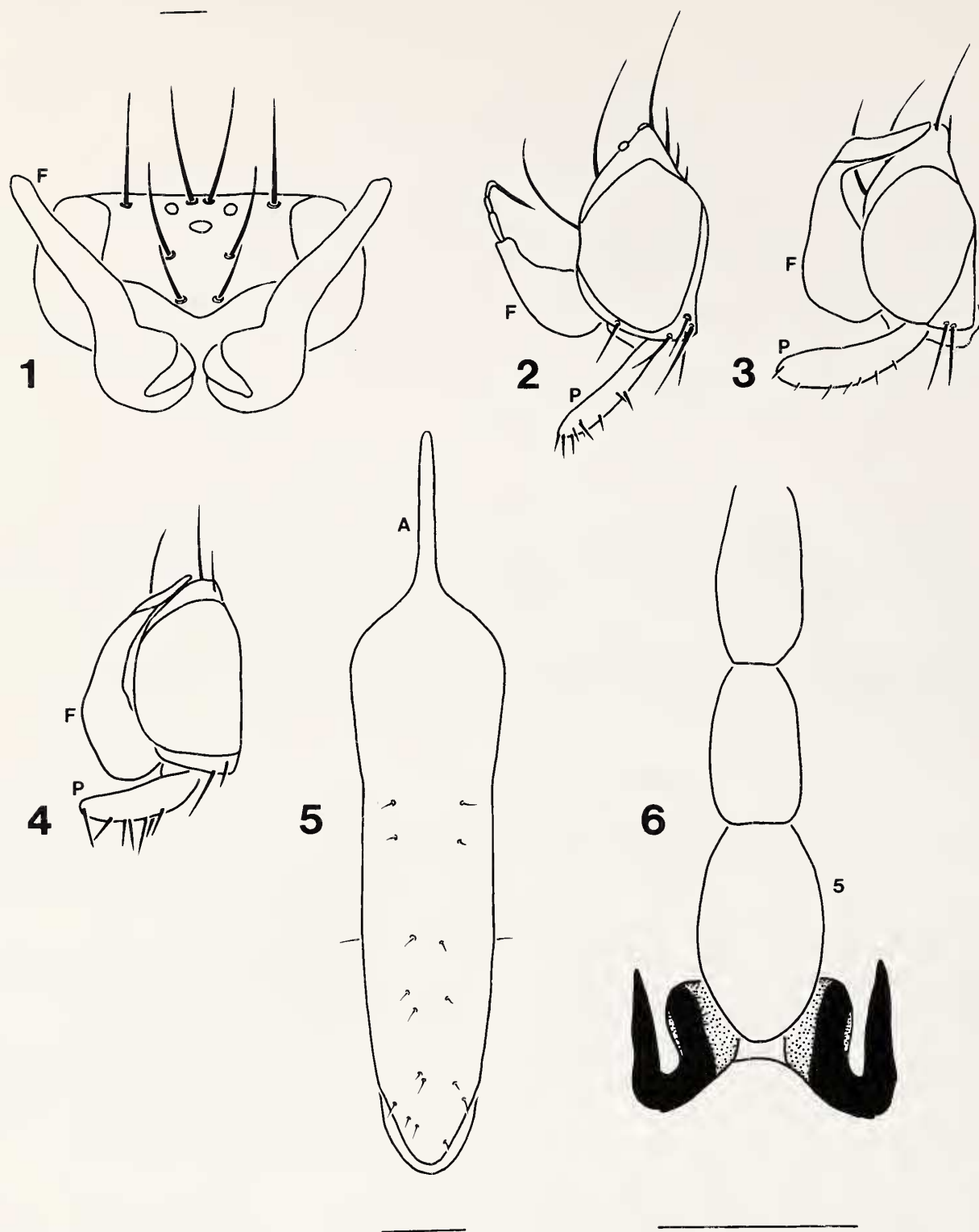
EMENDED DIAGNOSIS. The genus *Apocephalus* was diagnosed previously (Brown, 1993, p. 218), but because of the atypical structure of females of the *A. truncaticercus*-infragroup, the following change, shown in *italic*, should be made: . . . anterior margin [of ovipositor] usually with dark periphery in dorsal view; *species with a uniformly darker ovipositor lack middle and lower fronto-orbital seta.*

The diagnosis of subgenus *Mesophora* given previously (Brown, 1993, p. 218) is still adequate, although females of the *A. truncaticercus*-infragroup must be added to *A. antennatus* Malloch as species lacking dark abdominal glands.

Apocephalus truncaticercus-infragroup
Brown, 1993

DIAGNOSIS. Male with apex of flagellomere 1 markedly narrowed at base (Fig. 1). Female flagel-

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Figures 1-6. *Apocephalus (Mesophora) truncaticercus*-group species (scale bar = 0.1 mm; Figs. 1-4 to same scale). 1-3. *A. brevicercus* Brown. 1, Male frons and flagellomere 1, frontal; 2, female head, lateral; 3, male head, lateral. 4. *A. nitifrons* new species, male head, lateral. 5, 6. *A. brevicercus* Brown. 5, Female ovipositor, dorsal; 6, female foretarsomeres 3-5. Abbreviations: 5 = tarsomere 5; A = anterior projection of ovipositor; F = flagellomere 1; P = palpus.

lomere 1 pyriform (Fig. 2). Female lacking lower and middle fronto-orbital seta; lacking darkly sclerotized abdominal glands; ovipositor dark, evenly sclerotized, without darker anterior margin; tarsomere 5 and claw enlarged, especially on foreleg (Fig. 6).

NOTES ON DIAGNOSIS AND RECOGNITION. As a group, males of these species are recognized by the elongate, narrowed apex of flagellomere 1, but species recognition within the group is difficult. All are extremely similar, with only slight structural differences. Within the Phoridae, species are defined narrowly at present, and research has

shown that there are groups of extremely similar cryptic forms within some genera (Disney, 1989). These forms generally are recognized as separate species. Therefore, with these guidelines in mind, three new species are described below. Collection of further specimens from more sites will resolve the species limits in this complex.

Females of this group are highly atypical. They lack the dark abdominal glands found in most other species of subgenus *Mesophora*, and the ovipositor is dark and uniformly sclerotized, unlike that of most other *Apocephalus*. Females can be recognized relatively easily by the lack of both middle

and lower fronto-orbital setae, both of which are otherwise absent in only *A. limai* Prado and *Apocephalus* unnamed species A (of Brown, 1993). Both of these other species have ovipositors with dark anterior margins and smaller apical tarsomeres.

Furthermore, *A. truncaticercus*-infragroup females are structurally divergent from males. This is especially striking in *A. truncaticercus* and *A. brevicercus*, species that have mostly brown-colored males and yellow-colored females. One of the few characters that link the two sexes is the presence of enlarged tarsal claws, which are especially pronounced in females.

PHYLOGENETIC RELATIONSHIPS. These species are part of the *A. wheeleri*-subgroup (Brown, 1993), diagnosed by the presence of a rounded dorsal apex of the female ovipositor.

Monophyly of the *A. truncaticercus*-infragroup is supported by the following hypothesized synapomorphic character states:

- 1. Flagellomere 1 of males narrowed abruptly on apical two-thirds (Fig. 1).
- 2. Right surstylus of male with number of setae reduced to three or fewer (Figs. 7, 9, 11). The holotype of *A. truncaticercus* is an unusual exception, with more setae present.
- 3. Apex of male cercus truncate, slightly enlarged apically (Brown, 1993: figs. 8, 9, 29, 30).
- 4. Female tarsomere 5 and claw enlarged, especially on foreleg (Fig. 6).
- 5. Middle fronto-orbital seta absent on female.
- 6. Female ovipositor darkly sclerotized throughout.
- 7. Female ovipositor with long, narrow anterior process (Fig. 5).

Within this group, I cannot reconstruct the phylogenetic relationships at this time. Species are extremely similar, with the characters separating them of little apparent phylogenetic value. In my search for synapomorphic character states to group species, I considered the following:

- 1. Palpus enlarged, inflated, with setulae reduced (Fig. 3).

Most outgroup taxa have a relatively small palpus with well-developed setulae.

This is the most promising character state, and represents a potential synapomorphy of *A. grandiflavus* and *A. brevicercus*. It also occurs in a few other species of subgenus *Mesophora*, outside of the *A. truncaticercus*-infragroup.

- 2. Body color mostly dark brown.

Outgroup taxa, other species of *Apocephalus*, generally are yellow-colored.

The phylogenetic value of this character state is dubious. Specimens of *A. brevicercus* and *A. truncaticercus* can be either brown or yellow, and some other, unrelated, species of subgenus *Mesophora* are brown to a varying extent. Brown body color as a synapomorphy would group *A. brevicercus* (most specimens), *A. nitifrons*, *A.*

satanus, and *A. truncaticercus*, conflicting with the other proposed synapomorphy, above.

Analysis of these scanty data seems futile. When females are known for all species, some further character states likely will become apparent.

LIFE HISTORY. The hosts of these flies are unknown, but their closest relatives are parasitoids of beetles of the family Lampyridae (Brown, 1994; Lloyd, 1973). These other species are multiple parasitoids of their hosts, and the abdomen of one specimen of *A. grandiflavus* contained 22 mature eggs.

KEY TO ADULT MALES

- 1 Setae of cercus and proctiger of normal size, longer and thicker than short setae of epandrium (Brown, 1993: figs. 9, 30); hind femur of uniform color 2
- 2 Setae of cercus and proctiger markedly reduced, subequal to short setae of epandrium (Brown, 1993: figs. 8, 29); hind femur with abrupt, distinctive darkening at apex
..... *Apocephalus brevicercus* Brown
- 2(1) Palpus of male small with setae normal, thick, moderately long, pointed (Fig. 4); right side of epandrium, in addition to ventral setae, with 1–3 lateral setae (Figs. 9, 11) 3
- 3 Palpus of male enlarged, with setae reduced, thin, short, stubby (Fig. 3); right side of epandrium, in addition to ventral setae, with numerous lateral setae (Fig. 7)
..... *Apocephalus grandiflavus* new species
- 3(2) Frons glossy, dark brown
..... *Apocephalus nitifrons* new species
- 4 Frons opaque, dark brown to yellow 4
- 4(3) Flagellomere 1 dark brown throughout; hind femur dark brown; palpus brown; epandrium with anterior part short, bulging anteriorly (Figs. 11, 12)
..... *Apocephalus satanus* new species
- Flagellomere 1 yellowish at base, apically darker; hind femur yellowish brown; palpus yellow; epandrium with anterior part short, straight (as in Figs. 9, 10)
..... *Apocephalus truncaticercus* Brown

KEY TO ADULT FEMALES

(Note: Female of *A. nitifrons* unknown; females of *A. grandiflavus* and *A. truncaticercus* cannot be separated at this time.)

- 1 Tip of hind femur dark brown to black, contrasting sharply with yellowish color of rest of femur; frons glossy yellow
..... *Apocephalus brevicercus* Brown
- Tip of hind femur yellowish brown or dark brown, color little differentiated from rest of femur; frons opaque, yellow or brown 2

- 2 Body color, including halter and palpus, dark brown *Apocephalus satanus* new species
- Body color yellow *Apocephalus grandiflavus* new species
- *Apocephalus truncaticercus* Brown

Apocephalus brevicercus Brown, 1993
 Figures 1–3, 5, 6

SPECIES RECOGNITION AND GEOGRAPHICAL DISTRIBUTION. Males are recognized easily by the reduced setae of the cercus. Females can be separated from those of other species by the glossy yellow frons and the darkened apex of the hind femur.

Besides several localities in Costa Rica, this species occurs also in the Dominican Republic. Unlike specimens from Costa Rica, which have the frons brown, some specimens from the Dominican Republic have the frons yellow. Furthermore, some newly collected specimens from Costa Rica and the Dominican Republic have the halter yellow, rather than brown as in the original description.

The females are strikingly divergent from the males: females are yellow, whereas males are mostly dark brown in color. The original association of the sexes was based on co-occurrence of male and female specimens in Malaise trap samples from San Gerardo, Costa Rica, where apparently *A. brevicercus* is the only *Mesophora* species present.

DESCRIPTION. Body length 1.6–2.3 mm. Frons yellow or brown; opaque in male, glossy yellow in female. Mean frontal ratio 0.79. Color of flagellomere 1 yellowish at base, apically darker in male; flagellomere 1 of female yellow. Flagellomere 1 of female pyriform (Fig. 2). Palpus yellow. Palpus of male enlarged, with setae reduced, thin, short, stubby (Fig. 3). Palpus of female small to enlarged, with setae normal, thick, moderately long, pointed (Fig. 2). Dorsum of thorax yellow to dark brown. Pleural regions yellow to dark brown. Legs yellowish brown. Hind femur yellowish brown, with abrupt, distinctive darkening at apex. Mean costal ratio 0.56, range 0.54–0.59. Mean costal sector ratio 3.96:3.45:1, range 3.08–5.50:2.71–4.50:1. Wing vein R_{2+3} well developed. Halter yellow or brown. Ventral setae of female segment 6 absent. Venter of male segment 6 bare. In cleared specimens, female dorsal abdominal glands invisible.

Female Terminalia. Female intersegment 6–7 without distinct sclerite. Ovipositor (Fig. 5) triangular; dorsally broad; anterodorsal portion narrowed, elongate; anteroventral margin smooth, without notch; posterodorsal apex of ovipositor rounded; in lateral view, posteroventral apex of ovipositor straight; posteroventral apex of ovipositor rounded. Stylet with lateral barbs. Dorsal sclerite consisting of two small processes.

Male Terminalia. Epandrium globular, with anterior part short, straight, with setae near cercus not markedly larger than other epandrial setae. Left side of epandrium with thick, ventral setae. Right side

of epandrium with faint, unsclerotized dorsolateral ridge; in addition to ventral setae, with one to three lateral setae. Right surstylus short, rounded, lacking ventral carina. Number of setae on right surstylus two to three. Cercus yellow. Setae of cercus and proctiger markedly reduced, subequal to short setae of epandrium.

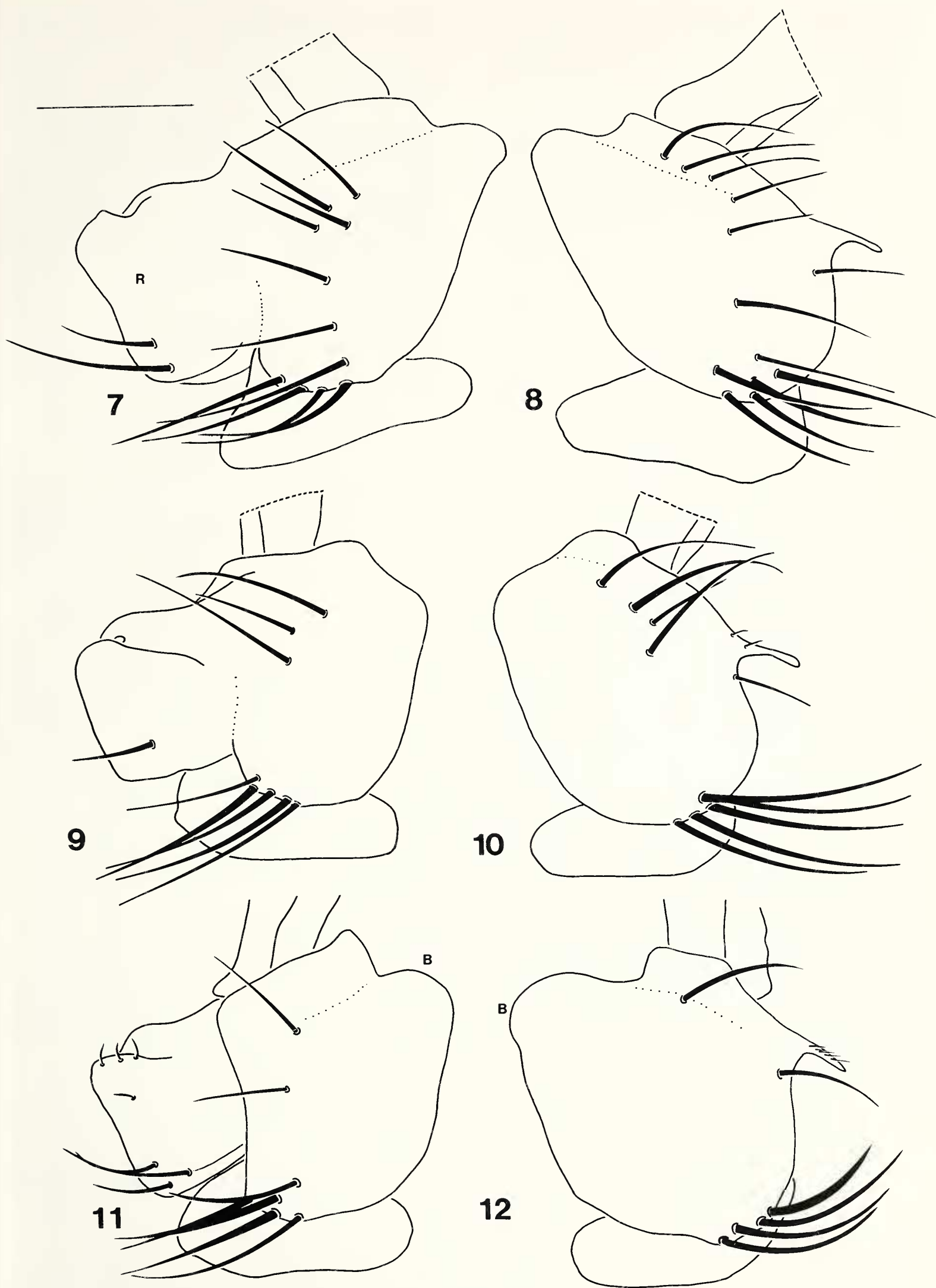
NEW MATERIAL EXAMINED. COSTA RICA: San José: 20 km S. Empalme, 9.63°N, 83.85°W, 1♀, ix.1988, P. Hanson, Malaise trap, 2800 m (LACM), 6 km N San Gerardo, 9.95°N, 84.05°W, 2♀, ix.1992, 3♀, x.1992, 1♂, 8♀, xi.1992, 3♀, xii.1992, 1♂, 3♀, i.1993, P. Hanson, Malaise trap, 2800 m (INBIO, LACM, MCZ, MICR, USNM), 26 km N San Isidro, 9.5°N, 83.72°W, 1♂, ii–v.1992, P. Hanson, Malaise trap, 2100 m (LACM); Zurquí de Moravia, 10.05°N, 84.02°W, 1♀, x–xii.1990, 1♀, iii.1991, 1♂, iv.1991, 1♂, vi.1991, 2♀, xii.1991–ii.1992, 1♀, iv–v.1993, 1♂, 1–15.vi.1993, P. Hanson, Malaise trap, 1600 m (LACM, MCZ, MICR). DOMINICAN REPUBLIC: Independencia: 5 km NNW Angel Feliz, 18.68°N, 71.78°W, 1♂, 13–15.x.1991, 1♂, 21–22.vii.1992, J. Rawlins *et al.*, cloud forest, 1780 m (CMNH, LACM); Pedernales: La[s] Abeja[s], 38 km NNW Cabo Rojo, 18.15°N, 71.63°W, 2♂, 1♀, 15.vii.1987, J. Rawlins & R. Davidson, 1250 m (CMNH, LACM), Upper Las Abejas, 38 km NNW Cabo Rojo, 18.15°N, 71.63°W, 2♀, 22.vii.1990, L. Masner, sweeping, mesic deciduous forest, 1350 m (CMNH).

Apocephalus grandiflavus new species
 Figures 7, 8

SPECIES RECOGNITION. Males can be recognized by the enlarged, yellow palpi and the greater number of setae on the right side of the epandrium. Females can be separated from those of *A. brevicercus* (the only other species of this group known from the Dominican Republic) by the hind femur, which is without dark color at base.

DESCRIPTION. Body length 1.4–2 mm. Frons yellow, opaque. Mean frontal ratio 0.78. Color of flagellomere 1 yellowish at base, apically darker in male, female with flagellomere 1 yellow. Flagellomere 1 of female pyriform. Palpus yellow. Palpus of male enlarged, with setae reduced, thin, short, stubby. Palpus of female small to elongate, with setae normal, thick, moderately long, pointed. Dorsum of thorax yellow. Pleural regions yellow. Legs yellow. Hind femur yellowish brown; evenly colored throughout. Mean costal ratio 0.55, range 0.53–0.58. Mean costal sector ratio 4.99:4.13:1, range 4.25–6.33:3.67–5.00:1. Wing vein R_{2+3} well developed. Halter yellow. Ventral setae of female segment 6 absent. Venter of male segment 6 bare. In cleared specimens, female dorsal abdominal glands invisible.

Female Terminalia. Female intersegment 6–7 without distinct sclerite. Ovipositor triangular; dorsally broad; anterodorsal portion narrowed, elongate; anteroventral margin smooth, without notch; posterodorsal apex of ovipositor rounded; in lateral view, posteroventral apex of ovipositor straight; posteroventral apex of ovipositor rounded. Stylet with lateral barbs. Dorsal sclerite consisting of two small processes.



Figures 7–12. *Apocephalus* (*Mesophora*) *truncaticercus*-group species, male terminalia, cercus and proctiger truncated, right side and left side (scale bar = 0.1 mm; all figures to same scale). 7, 8. *A. grandiflavus* new species. 9, 10. *A. nitifrons* new species. 11, 12. *A. satanus* new species. Abbreviations: B = bulge of epandrium; R = right surstylus.

Male Terminalia. Epandrium globular, with anterior part elongate (Figs. 7, 8), with setae near cercus not markedly larger than other epandrial setae. Left side of epandrium with thick, ventral setae. Right side of epandrium with faint, unsclerotized dorsolateral ridge; in addition to ventral setae, with numerous lateral setae. Right surstylus short, rounded, with ventral carina short, extended partially across surstylus. Number of setae on right surstylus two. Cercus yellow. Setae of cercus and proctiger of normal size, longer and thicker than short setae of epandrium.

GEOGRAPHICAL DISTRIBUTION. Known only from some middle-elevation sites in the Dominican Republic.

DERIVATION OF SPECIFIC EPITHET. The name of this species is based on Latin words meaning "large" and "yellow," referring to the palpus of male specimens.

HOLOTYPE. ♂, DOMINICAN REPUBLIC: Pedernales: 3.3 km NE Los Arroyos, 18°15'N, 71°45'W, 16–18.vii.1990, L. Masner *et al.*, wet montane forest, sweep samples, 1450 m (CMNH).

PARATYPES. DOMINICAN REPUBLIC: Azua: 7 km WNW Barrero, 18.35°N, 70.97°W, 1♂, 25–26.vii.1992, C. Young *et al.*, cloud forest adjacent to disturbed forest, 860 m (CMNH); Pedernales: La[s] Abeja[s], 38 km NNW Cabo Rojo, 18°09'N, 71°38'W, 18♂, 30♀, 15.vii.1987, J. Rawlins & R. Davidson, 1250 m (CMNH, LACM, MCZ), Upper Las Abejas, 1♀, 22.vii.1990, L. Masner, sweeping, mesic deciduous forest, 1350 m (CMNH), 18♂, 6♀, same data as holotype (CMNH, LACM, USNM), 5 km NE Los Arroyos, 18°15'N, 71°45'W, 1♀, 17–18.vii.1990, 1♂, 28.vii.1990, C.W. Young *et al.*, 1680 m (CMNH).

Apocephalus nitifrons new species

Figures 2, 9, 10

SPECIES RECOGNITION. Males can be recognized by the shiny, dark brown frons, brownish palpus, and brown halter. Females are unknown.

DESCRIPTION. (Male only, female unknown.) Body length 1.3–1.6 mm. Frons brown, glossy. Mean frontal ratio 0.73. Color of flagellomere 1 yellowish at base, apically darker. Palpus brown, small, with setae normal, thick, moderately long, pointed (Fig. 2). Dorsum of thorax dark brown. Pleural regions dark brown. Legs yellowish brown. Hind femur yellowish brown, evenly colored throughout. Mean costal ratio 0.56, range 0.53–0.58. Mean costal sector ratio 3.98:3.48:1, range 3.78–4.50:3.33–3.75:1. Wing vein R_{2+3} well developed. Halter brown. Venter of male segment 6 bare.

Male Terminalia. Epandrium globular, with anterior part short, straight (Figs. 9, 10), with setae near cercus not markedly larger than other epandrial setae. Left side of epandrium with thick, ventral setae. Right side of epandrium with faint, unsclerotized dorsolateral ridge; in addition to ventral setae, with one to three lateral setae. Right surstylus short, rounded, with ventral carina short, extended

partially across surstylus. Number of setae on right surstylus one. Cercus brown. Setae of cercus and proctiger of normal size, longer and thicker than short setae of epandrium.

GEOGRAPHICAL DISTRIBUTION. Known only from two sites in Costa Rica.

DERIVATION OF SPECIFIC EPITHET. The name of this species is derived from Latin words meaning "shiny frons."

HOLOTYPE. ♂, COSTA RICA: San José: Zurquí de Moravia, 10.05°N, 84.02°W, vii.1992, P. Hanson, Malaise trap, 1600 m (LACM).

PARATYPES. COSTA RICA: Puntarenas: Las Alturas, 8.95°N, 82.83°W, 3♂, i.1992, P. Hanson, Malaise trap (LACM, MICR); San José: Zurquí de Moravia, 10.05°N, 84.02°W, 1♂, x–xii.1990, 1♂, xii–ii.1992, 1♂, vii.1992, P. Hanson, Malaise trap, 1600 m (LACM).

Apocephalus satanus new species

Figures 11, 12

SPECIES RECOGNITION. Males and females can be recognized by the overall dark brown color.

DESCRIPTION. Body length 1.4–1.8 mm. Frons brown, opaque. Mean frontal ratio 0.84. Color of flagellomere 1 brown. Flagellomere 1 of female pyriform. Palpus brown. Palpus of male small, with setae normal, thick, moderately long, pointed. Palpus of female small, with setae normal, thick, moderately long, pointed. Dorsum of thorax dark brown. Pleural regions dark brown. Legs dark brown. Hind femur dark brown, evenly colored throughout. Mean costal ratio 0.57, range 0.56–0.59. Mean costal sector ratio 3.61:2.53:1, range 3.17–4.20:2.17–2.80:1. Wing vein R_{2+3} well developed. Halter brown. Ventral setae of female segment 6 absent. Venter of male segment 6 bare. In cleared specimens, female dorsal abdominal glands invisible.

Female Terminalia. Female intersegment 6–7 without distinct sclerite. Ovipositor triangular; dorsally broad; anterodorsal portion narrowed, elongate; anteroventral margin smooth, without notch; posterodorsal apex of ovipositor rounded; in lateral view, posteroventral apex of ovipositor straight; posteroventral apex of ovipositor rounded. Stylet with lateral barbs. Dorsal sclerite consisting of two small processes.

Male Terminalia. Epandrium globular, with anterior part short, bulging anteriorly (Figs. 11, 12), with setae near cercus not markedly larger than other epandrial setae. Left side of epandrium with thick, ventral setae. Right side of epandrium with faint, unsclerotized dorsolateral ridge; in addition to ventral setae, with one to three lateral setae. Right surstylus short, rounded, with ventral carina short, extended partially across surstylus. Number of setae on right surstylus three. Cercus brown. Setae of cercus and proctiger of normal size, longer and thicker than short setae of epandrium.

GEOGRAPHICAL DISTRIBUTION. Known from three middle-elevation sites in Costa Rica.

DERIVATION OF SPECIFIC EPITHET. The

species is named after Satan, an indirect reference to darkness, and refers to the dark color of these flies.

HOLOTYPE. ♂, COSTA RICA: San José: Zurquí de Moravia, 10.05°N, 84.02°W, iv–v.1993, P. Hanson, Malaise trap, 1600 m (LACM).

PARATYPES. COSTA RICA: Puntarenas: Monteverde, 10.1°N, 83.43°W, 1♂, 12–15.vi.1974, J.P. Donahue, Malaise trap (LACM); San José: 14 km N San Isidro, 9.37°N, 83.7°W, 1♂, 20–23.vi.1974, J.P. Donahue, Malaise trap (LACM), Zurquí de Moravia, 10.05°N, 84.02°W, 1♀, v.1992, P. Hanson, Malaise trap, 1600 m (LACM).

Apocephalus truncaticercus
Brown, 1993

NOTES ABOUT NEW MATERIAL. Additional specimens of this species have been collected. Unlike the holotype, these new specimens have only one or two setulae on the right surstylus. Specimens from La Cangreja have a yellower frons and halter, unlike the mostly dark brown specimens from Zurquí. Based on this color difference, I considered separating the La Cangreja specimens as a new species. Because no other differences were found, and because other species vary markedly in color, I abandoned this separation.

DESCRIPTION. Body length 1.3–1.5 mm. Frons yellow to brown, opaque. Mean frontal ratio 0.7. Color of flagellomere 1 yellowish at base, apically darker in male, female with flagellomere 1 yellow, pyriform. Palpus yellow. Palpus of male small, with setae normal, thick, moderately long, pointed. Palpus of female small, with setae normal, thick, moderately long, pointed. Dorsum of thorax yellow. Pleural regions yellow. Legs yellow to yellowish brown. Hind femur yellowish brown; evenly colored throughout. Mean costal ratio 0.56, range 0.54–0.58. Mean costal sector ratio 4.36:2.98:1, range 3.33–6.33:2.50–3.67:1. Wing vein Rs slender, subequal to or thinner than costa. Wing vein R₂₊₃ well developed. Halter yellow, or brown. Ventral setae of female segment 6 absent. Venter of male segment 6 bare. In cleared specimens, female dorsal abdominal glands invisible.

Female Terminalia. Female intersegment 6–7 without distinct sclerite. Ovipositor triangular; dorsally broad; anterodorsal portion narrowed, elongate; anteroventral margin smooth, without notch; posterodorsal apex of ovipositor rounded; in lateral view, posteroventral apex of ovipositor straight; posteroventral apex of ovipositor rounded. Stylet with lateral barbs. Dorsal sclerite broadly truncate.

Male Terminalia. Epandrium globular, with anterior part short, straight, with setae near cercus not markedly larger than other epandrial setae. Left side of epandrium with thick, ventral setae. Right side of epandrium with faint, unsclerotized dorsolateral ridge; in addition to ventral setae, with one to three lateral setae. Right surstylus short, rounded, with ventral carina short, extended partially across sur-

stylus. Number of setae on right surstylus one to many. Cercus yellow. Setae of cercus and proctiger of normal size, longer and thicker than short setae of epandrium.

NEW MATERIAL EXAMINED. COSTA RICA: Cartago: La Cangreja, 9.8°N, 83.97°W, 7♂, vii.1991, 2♂, viii–ix.1991, 3♂, xi.1991, 3♂, iii–v.1992, 6♂, 1♀, vi–vii.1992, P. Hanson, Malaise trap, 1950 m (CMNH, INBIO, LACM, MCZ, MICR); San José: Zurquí de Moravia, 10.05°N, 84.02°W, 2♂, vii.1992, P. Hanson, Malaise trap, 1600 m (LACM).

Other A. truncaticercus-Infragroup
Specimens

A single female of an as yet undescribed species (CMNH) was collected in Ecuador. There probably are many such undescribed species in the Andes of South America.

The material described in this paper raises the number of species of subgenus *Mesophora* to 31, in a group that originally contained only 6 species. I expect that further new species will be collected when other middle-elevation forests in South and Central America are surveyed.

ACKNOWLEDGMENTS

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